

The Application of VR in Virtual Design

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Abstract. As a popular technology, Virtual Reality (VR) is getting into our lives at a rapid speed. Following this trend, there are more and more applications in different areas, especially in areas that are highly related to virtual design where VR can help to produce a sense of reality for people. Thus, this paper researched related articles and lectures to conclude current VR applications. This work mainly explores VR applications in movies, games, and media. This research also investigates the advantage, disadvantages, effects, and future development of the VR application in each field. These factories are the most representative area in this field so they can help to show the whole trend. From the study, it can see that the benefits VR brings overweight its disadvantages. VR will be more popular and useful with more effort from companies and universities, and it will change the way people treat these areas.

Keywords: virtual reality; VR application; Benefits of VR

1. Introduction

VR, new technology helps people to see things from different sight. VR is just like another eye for people. With the help of VR, people didn't see through a fixed position. VR just makes them feel like they are watching through other people's eyes. Just like the name, VR can create a virtual reality and attract people to confirm what they see. About its developing trend, there has been lots of research and survey of the strong power it can provide and the high exception of the technology. All of them are showing us 2 signs. One is that VR is a are full of potential. The other is the application of VR is slower than the advance it brings. This paper wants to conclude this trend to better describe this area and estimate its future.

2. Main Body

This study formed with the association with the current application, advantages, disadvantages, effects, and importance of this technology. The current event reveals how it develops now. Advantages and disadvantages mainly talk about the pros and cons to use it in this area and why. For the effect and importance, it focuses on the impact on the area and society. Which can symbolize the current and future development trends.

2.1. Movie

The movie industry is one of the most popular industries in the world. According to the 2021 THEME report by MPAA, the global theatrical and home entertainment market, in total grew to \$328.2 billion. So, with this popular market, it is oblivious that the most advanced technology in virtual design will be applied to the movie industry.

2.1.1. The use of VR in movies.

VR movie is a new type of movie. It shows us the view of the movie in a way that avoids the stationary restricted by the screen. Viewers are free to choose an angle of view. It provides a better view to the audience. Make movies more vivid. However, VR has not been widely used in movies. According to the vice president of AMD, Roy Taylor on GamesBeat 2016, there are over 160 VR

movie experience services and over 200 are undergoing in Hollywood. Most VR movies are not as popular as the experience they can bring to the audience (figure 1).



Figure 1. A woman is watching a VR movie

2.1.2. The advantages and disadvantages of using VR in movies.

VR provides an immersion with the audience. Audiences with a scene where they can move to different points of view will have a strong immersion. “Immersion can be an intellectually stimulating process; however, in the present as in the past, in most cases, immersion is mentally absorbing and a process, a change, a passage from one mental state to another. It is characterized by diminishing critical distance to what is shown and increasing emotional involvement in what is happening” [1]. This helps movies attract people to watch and watch again.

On the other hand, the use of VR also brings a lot of problems. To produce a VR film, movie companies have to use a lot of cameras to shoot the film, spending more time on a scene. What’s more, VR devices are expensive. For instance, most of the VR glasses on JingDong are at 2000yuan or more. Last but not least, according to a survey on discord and Reddit by Aaron Santiago and Winston Nguyen, 57.8 percent of people have motion sickness after watching VR (Figure 2). It reduces the popularity of VR.

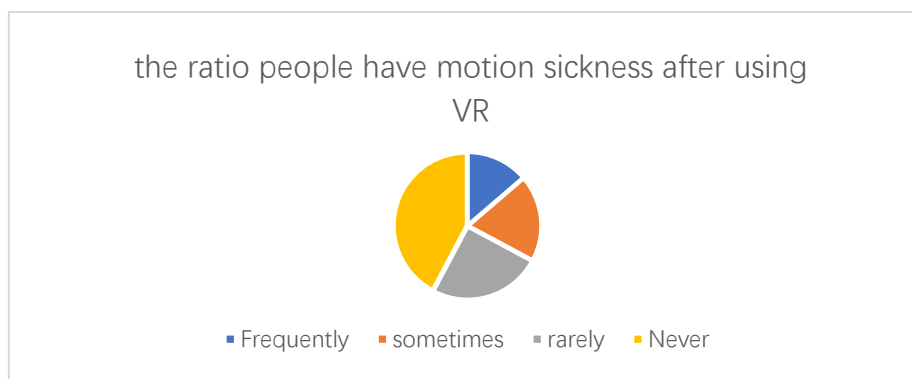


Figure 2. The result of the survey

2.1.3. The effect VR brings to the movie.

As VR shows up in this career, it changes the way people think of the movie. In the past, movies are like lifelike animations. After that, 3D makes the picture more realistic. After 3D, here comes VR. It gives the audience free to choose to watch the picture from what angle. As a result, the experience of performance is different for actors from movies. “If the audience will watch in first person, they will be the ghost vision of the main character. The camera will replace the audience to see” [2]. “It helps directors to treat camera language with a new sight. Not only brings the technical upgrade, but

also presents a unique space as the core narrative features” [3]. The most important effect it has on the movie is the position of the camera. Free view means that it is hard to make the audience focus on one specific important point at a moment. So, producers must consider the scene’s connections and how to present a good, continuous story with a new view.

2.1.4. The future of VR movie

Mark Lambert, a VR Director & VFX Supervisor said: “With over 30 years in the world of animation, VFX, and VR, I look for creative projects that I can be proud to have been a part of ones that offer that perfect culmination of challenging, creative work and a bunch of great people to work with that make these projects a success.” In the future, with the popularization of VR devices and the development of companies and actors in shooting and expressing the story with VR. It will keep on the rapid development trend as before. Although it is still not very popular now, it will be the most popular tech in the following years.

2.2. Media

Media is a way that people gain information. It can be a newspaper, internet, radio, or magazine. To produce more attractive or more accurate information, VR will be applied in the media area.

2.2.1. The use of VR in media.

VR news is a new kind of news that appeared recently. It creatively combines news and VR, giving the audience ways to watch the scene in news from a different angle of view. The audience will feel the news in a lively way. It has not been widely used in the news because it will take a lot of time and money to make it, while news requires strong timeliness. An important example of VR news is the Belt and Road Forum for international cooperation in 2017, May 14-15. On the other hand, it has been used widely on the Internet (Figure 3). For example, sellers are using VR in selling houses. Those who want to buy the house can have a VR view online before they go to where it is. With this technology, people can define whether they like the house or not or go on looking for another house more efficiently. Another example is VR in advertising. Some companies are started to create VR models of their products so that buyers can view the product from a different position. After carefully checking, consumers are more likely to buy the product.



Figure 3. What might VR news be like

2.2.2. The advantages and disadvantages of using VR in media.

For the advantage, VR can bring new chances to traditional media. It can help traditional media to develop into a more lively and attractive form. It also helps consumers to learn about things they want to buy in a more accurate way than photos or videos (figure 4). Some reports reveal that “immersive visual media technologies may be effective tools for public relations practitioners to use to draw viewers into the content and enhance their positive attitudes toward it” [4]. On the other hand, it is still expensive and takes a lot of time to make VR news. If users want to make a thing to VR, it will take months to reach the effect users want it to be. Another point is that people who rapidly watch the news, the elder people, are those who are not willing to buy VR devices. It causes VR news harder to gain popularity.



Figure 4 A scene in VR of watching news

2.2.3. The effect VR brings to the media

It gives us a new sight to treat media. Not only as something to read, to listen to. According to CSM data, most people who watch TV over 100 minutes long are over 45 years old. The average time for people over 15-24 and 25-34 years old on TV is around 1 hour. VR will be the bridge to connect the user ng with reading news. “The use of VR technology in news reports can almost reproduce the original appearance of news events. The audience does not need to rely on the fragmentary images and words in traditional news reports to understand news events. Viewers can even grasp the details in the process and environment of events, which greatly improves the depth and breadth of news” [5]. It can help news become more favorable on the Internet. As the cost of money and time become lower in the future. VR will be probably used widely in the media area. People will be able to use their visual sense in more efficient ways, ways that can get more and more accurate information.

2.3. VR games

A virtual reality game or VR game is a videotape game played on virtual reality (VR) tackle. utmost VR games are grounded on player absorption, generally through a head-mounted display unit or headset and one or further regulators. The headset generally provides two stereoscopic displays in front of the stoner's eyes to pretend a 3D space. “Virtual reality (VR) is a hot technology that has developed rapidly in recent years” [6].

2.3.1. The current application of VR games

VR brings a lot of things to games that traditional games don't have. For example, VR can bring a more immersive and interactive experience to games.

- Immersive experience games, such as social VR a game where players are on a virtual beach, can play football with other players, and can dance. Players can experience more excitement, players are first taken into the air, fly very high, and then start to free fall. Of course, no matter how high players fly, they always have to land, and soon, it begins to free fall. It's a heart-pounding experience. In reality, our feet were still standing firmly at the press conference, but as players saw themselves falling vertically, the horizon was getting closer to me, and my heartbeat was getting faster and faster. If this only appeared on the computer screen, we wouldn't have any reaction at all. Another example is Waltz of the Wizard lets players try the experience of being a magician, collecting magic items, and putting things into pots to create magic effects, players can also try putting a small ball into the pot, so they can get new abilities, user can shoot lightning by shaking the handle, and some players even believe they are a magician after playing (Figure 5).



Figure 5 Start scenario of Waltz of the Wizard

- Experience the high interactivity of VR games, hold the fps gamepad, and use the handle to simulate the operation of the characters in the scene, which can improve the degree of interaction between the user and the machine. For example, RIGS Mechanized Combat League is a VR shooter. The game, in which the player will be taken to an arena where user will fight against other robots. Compared with traditional games, game design under VR technology will be more realistic (Figure6).



Figure 6 Players in RIGS fight scene

2.3.2. The advantage of VR games

“VR provides games with rich visual effects and spatial expression means” [7]. Therefore, there will be some horror games. With the blessing of VR technology, they will become more realistic, and users can practice user r courage after playing for a long time. Not only that, because VR games involve a wide range of aspects, there are also some running VR games. With the space blessing of VR technology, VR games can help users burn user r calories and help users live a healthy life. The more interesting thing is that playing VR games can also reduce user r stress. With the help of VR games, in a certain game, user can be the boss and do whatever user want to relieve user stress. “After a long period of infiltration and spatial acceptance, VR games are gradually embedded in the daily life of users with their unique communication charm” [8].

2.3.3. The future of VR games

- The market demand is strong. “The improvement of people's spending power will change the focus of the experience of the game” [9]. Ray Davis, co-founder, and CEO of VR game company Vagrant Entertainment said: There are too many VR games now, which isolates players, which makes people very lonely. More and the improvement of people's spending power will also change the focus of people's gaming experience more, if users also play single-player games, it will be too monotonous. Therefore, the most urgent needs of users when playing games with friends will also be the most important places for VR game developers to consider in future development.

- The commercial potential is huge. Peter Wall, CEO of game market research firm Newzoo, said that VR can allow users to sit in the special seat of Oscar winner Jack Nelson and watch the American men's professional basketball game, or in "dota2" or "Counter-Strike.": Unrestricted

walking around the finals of Global Offensive. From this aspect, VR's role in e-sports is like watching sports live. This change will attract more games than VR games themselves. user. Imagine a picture in which audiences from all over the world can enter a place through VR. Everyone can post messages on the social media of the game platform and interact with other audiences. It is difficult in reality, but everything can be easily achieved in the game. Players have been told that game users are very happy with this change, which is undoubtedly the next market for the game industry.

- The development trend is good. The global president of Sony disclosed to the outside world the sales volume of Horizon VR. As of February 19, 2017, about 4 months after the launch, a total of 915,000 units were sold. Despite the ups and downs in 2016, many people have doubts about the VR game market, but the recent sales show that the number of VR game users is gradually increasing, and innovatively developed VR games have received a lot of praise. As long as developers are thoughtful in developing VR games, they can closely grasp market trends, produce corresponding VR game products according to market demand, and drive the entire game ecosystem into a virtuous circle.

2.4. Other aspects of VR

VR involves a wide range of fields. In addition to some of the more popular ones mentioned above, VR is also used in some less popular fields.

Experience the function of VR to break space limitations, such as the VR online museum, which can maximize the function of the museum and be an effective way to meet the multi-level and multi-dimensional needs of the public. With the continuous improvement and development of VR panoramic technology, the online museum display experience has become better and better. Using high-tech to display cultural relics, historical sites, and historical culture for people, visitors are shocked. Visitors can browse the real museum online. Scene; VR panorama breaks space and time, allowing visitors to browse museums around the world without leaving home. For example, the National Palace Museum in Taipei, although this website is not the most complete, it has a collection of 700,000 treasures, including Chinese royal objects, paintings, jade, porcelain, manuscripts, and bronzes. To enter the website, user can click the button of the website, then user can enter the Forbidden City in 720-degree VR, then user can come to the garden of the Forbidden City, pass through the palm trees, and come to the entrance of the museum. After entering the museum, user can watch and enjoy it as user please. Or user can choose a curated route for a guided tour. There are very detailed exhibits on the website, as well as audio guides. There is also a series of short films on the website, in which user can enjoy a lot of treasured artifacts.

Experience the function of VR online training, such as civil aviation employee training. In recent years, the civil aviation industry has been seriously studying how to use VR and wants to use VR to quickly train and test the ability level of employees, eliminating the actual practice of aircraft costs and dangers. VR provides a safe environment for trainees to hone their skills and experience the same dangerous situation, repeating the training until it is safe to operate. This VR experience has two modes: one for training and one for exams. In training mode, the system guides students with visual cues, who can restart operations, make mistakes, or watch the system complete tasks automatically. In the exam mode, the system will give a variety of difficult problems to ensure that students can make the correct response in different situations. Therefore, there is no need to bear the costs and dangers of operating on a real aircraft. Instructors also love VR training because VR can be used in any situation. With VR, instructors can put their knowledge into practice the same day they teach theory.

To experience VR online popular science education is to learn popular science knowledge through VR virtual reality technology. Different from traditional education, VR has more abundant forms of popular science, richer resources than traditional education, and is very attractive, which makes up for Inadequate traditional education. An example in real life is the safety science experience house launched by Zhongtianke, which incorporates various disaster elements, relies on VR, and uses VR virtual reality technology to let people feel the fire and typhoon in the virtual reality scene,

earthquakes, and other disaster elements, let people feel the disaster without harm and learn the measures that should be taken in the face of disaster. “VR technology will play a huge role in the training of hazardous chemical industry and emergency rescue, and the effect is better than the traditional training mode” [10].

3. Conclusion

This paper summarizes the current status of VR application through the study of relevant articles. It explores the use of VR in movies, games and media. It also discusses the advantages, disadvantages, effects and future development of VR applications in various fields.

There is no doubt about the future of VR+ education, but the factors that restrict the popularization of VR technology in the education field are also real. The first is the question of experience. The weight of the current VR glasses can guarantee an average of one and a half hours of comfortable wearing (varies from person to person), which is enough for playing VR games, but for long-term educational scenes, there will still be fatigued. After the miniaturization technology matures in the future, the split 6dofVR glasses are expected to be reduced to a weight of fewer than 100 grams, which will greatly improve the wearing experience. In addition, the current mainstream field of view (FOV) of VR all-in-one glasses is still about 100 degrees (PC headsets can reach 130 degrees, but it is not convenient for long-term wear), which is far from the ideal 120-degree field of view. There is some telescopic effect. To achieve high-precision content, the computing power of the device also needs to be further improved. At least now the all-in-one machine needs to reach the rendering power of the PC (a gap of about 5 years), or the computing power can be improved through cloud rendering technology. In addition, expression is a very important element in communication, and the current expression detection technology is still in the laboratory stage (but eye movement detection has been used in many B-side scenarios). It is expected that it will land on the C side in the next year or two.

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